Headquarters Resource Management Plan
for
Strengthening Sustainable Forest Management

2002-2003

FOREST
RENEWAL BC

Draft
September 28, 2001

BRITISH
COLUMBIA

106-01590/

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1 Introduction and Planning Context

Forest Renewal BC is in the midst of a five-year strategic plan for 1999-2003 to renew the forest economy in British Columbia. The plan is composed of seven Strategic Objectives (SO), one of which is *Strengthening Sustainable Forest Management* (SSFM). The SSFM strategic objective identifies and addresses key knowledge gaps to move British Columbia towards sustainable forest management.

Comment: Align with FRBC strategic plan

For upcoming fiscal 2002-03, the planning team (Appendix 1)for the Headquarters Resource Management Plan (HRMP) recommends SSFM investments to address three key provincial level Sustainable Forest Management Knowledge Issues. This document provides context and rationale for these Knowledge Issues. Readers interested in going directly to the SSFM Issues and Strategies are directed to the SSFM Templates (Appendix 2). On FRBC approval of the proposed Issues and Strategies, the planning team will develop details of the required activities.

1.1 SSFM and FRBC Strategic Objectives

Strengthening Sustainable Forest Management is one of the six FRBC Strategic Objectives that strive to improve forest management decision making, grow more high-value timber, restore the environment, and enhance the value-added sector (visit *http://www.forestrenewal.bc.ca/*). In addition to SSFM, the other Strategic Objectives:

- Sustainable Harvest
- Enhance Environmental Values
- Strengthen and Expand the Value Added Sector
- Stimulate Workforce Development to Strengthen the Forest Sector
- Sustain and Diversify Forest Community Economies

Specifically, Forest Renewal BC investments in SSFM will assist:

> *...in the development of relevant, useable, timely information and tools that are keyed to developing sustainable forest management".*

The five-year strategic SSFM target:

> *"Forest Renewal BC will work with its partners to identify key gaps in knowledge for sustainable forest management. By April 1, 2003, these key knowledge gaps will be addressed to help improve future Timber Supply Reviews and Land and Resource Management Plans".*

1.2 Knowledge Issues and Knowledge Strategies.

An SSFM Knowledge Issue is a gap in either knowledge or information that is a significant limiting factor to achieving sustainable forest management. An example is "inadequate and uncertain information and analysis for incorporating non-timber values in Timber Supply Review (TSR)". Here, sustainable forest management depends on correctly estimating the timber supply. However, a critical uncertainty in timber supply analysis is lack of information on the range of non-timber values and how to incorporate these values in timber supply reviews.

An SSFM Strategy is a means of addressing the identified knowledge issue. A strategy broadly defines the current state of existing knowledge or tools and then describes a series of steps to provide the required information or knowledge. The Strategy also includes targets and milestones as performance

indicators to assess progress in addressing the Issues. An SSFM Strategy may include more effective use of existing information, collection of new information or some combination of the two.

The proposed 2002-03 SSFM Issues (Template #1) and Strategies (Template #2) are described in Appendix 2a.

1.3 HRMP SSFM Planning process

The 2002-03 HRMP SSFM planning process was an inter-agency, collaborative effort of staff from

- Ministry of Agriculture, Food and Fisheries
- Ministry of Forests
- Ministry of Water, Air and Land Protection
- Ministry of Sustainable Resource Management
- Land Use Coordination Office
- Forest Renewal BC

The HRMP planning process (Appendix 3) began in June 2001 and comprised three team meetings to identify the top SSFM Knowledge Issues. Component Leaders then led smaller groups to document the Knowledge Issues and required Knowledge Strategies. The HRMP planning team provided input on several iterations of the Issues and Strategies templates (see Section 0 below) before a wider technical peer review by agencies and SSFM stakeholders (Appendix 4). Following the technical review, the SSFM template information was entered into an Internet database[1] to provide agency staff and stakeholders across the province access to the Knowledge Issues and Strategies.

Documents guiding the headquarters planning process included[2]:

- HRMP Guidelines
- HRMP/HIP Ground Rules
- 2002 / 03 Resource Management Plan Guidelines For The Forest Renewal Bc Strengthening Sustainable Forest Management Strategic Objective

1.4 Sources of 2002-03 SSFM Knowledge Issues

There were two driving forces (Figure 1) influencing the selection of key SSFM Knowledge Issues. The first were knowledge gaps hindering completion of Land and Resource Management Plans (LRMP) or Timber Supply Reviews[3] (TSR). These knowledge gaps, addressed in the previous 2001-02 HRMP, are:

SSFM Knowledge Gaps

- Lack of Criteria and Indicators of Environmental Sustainability
- Lack of Environmental Baselines
- Lack of Accounting for Sustainable Resource Benefits

Note, a fourth knowledge gap in 2001-02 was *Lack of Access to Information*. For 2002-03, Access to Information became part of two other SSFM issues as described below. A fifth FRBC SSFM component, *Growth and Yield* was handled by a separate and parallel planning process for 2002-03.

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[1] SSFM database: http://www.siferp.org/projects/2001/ssfm/

[2] These documents available at http://www.for.gov.bc.ca/cpp/rmp/guidelines/200203/

[3] Forest Renewal BC Business Plan 2001-2002

Figure 1. Driving forces and resulting SSFM Knowledge Issues

Higher Level Strategic Planning Processes
Land and Resource Management Plans
Timber Supply Reviews
Business Drivers
Maintain Environmental Values
Improve Access to Timber
Improve Access to World Markets
SSFM Knowlege Issues
Standards for criteria & indicators in forest certification
Environmental baselines
Decision support for sustainable Resource benefits

Addressing these three knowledge gaps will move the province further towards sustainable forest management.

The second driving force was business drivers derived from government objectives for resource and economic development[4]. These were *maintain environmental values*, *improve access to timber*, and *improve access to world markets*. Addressing the three knowledge gaps above will assist in achieving these government objectives.

In summary, the 2002-03 SSFM Knowledge Issues address information and knowledge gaps that hinder both completing higher level strategic planning and achieving government objectives of economic development and sustainable forest management.

2 Summary of Key SSFM Knowledge Issues and Strategies

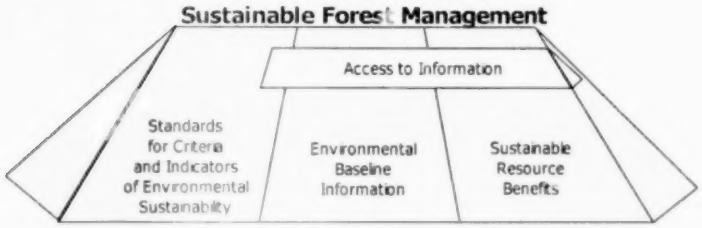
The HRMP Planning Team is recommending investments to deal with three provincial level SSFM Knowledge Issues (Figure 2). The Issues and Strategies are described briefly in **sections 2.1** to **2.3** below and in detail in Templates #1 and #2 (Appendices 2a, 2b, and 2c).

The fourth Knowledge Issue "*Access to Information*" addresses the lack of tools, extension, and ready access to the wide variety of available information and knowledge. To better focus delivery of information and knowledge, *Access to Information* is integrated into the first three Issues: *Environmental Baseline Information* (Template 2b) and *Sustainable Resource Benefits* (Template 2c).

[4] BC Provincial Government, " New Era Promises" and "Letters to the Ministers" at http://www.gov.bc.ca/prem/popt/letters/ne_list.htm

In addition, *Access to Information* is a minor component of the *Standards for Criteria and Indicators of Environmental Sustainability* Strategy (Template 2a).

Figure 2. SSFM 2002-03 Knowledge Issues


Sustainable Forest Management
Access to Information
Standards for Criteria and Indicators of Environmental Sustainability
Environmental Baseline Information
Sustainable Resource Benefits

2.1 Standards for Criteria and Indicators of Environmental Sustainability

This issue addresses lack of provincial government approved, and stakeholder accepted, standards for Criteria and Indicators of Environmental Sustainability used in various forest management certification systems

The issue or obstacle to achieving forest certification is in having government approved, and stakeholder accepted, standards for criteria and indicators of environmental sustainability. Here stakeholders can include both agencies that carry out certification audits and companies seeking certification. While it is not government's role to certify forest operations, government does have the role of guiding the development and assessment of standards for these criteria and indicators that will be used in certification. Addressing this knowledge issue will guide how environmental sustainability will be assessed and increase access to international markets for BC forest products.

2.2 Environmental Baseline Information

This issue addresses the lack of knowledge on environmental baseline information to assess sustainable forest management.

There is a lack of current environmental baseline coverage for indicators of sustainability. Further, there is a need to develop tools, techniques and action plans to make maximum agency and stakeholder use of existing data to fill priority knowledge gaps in environmental baseline information. This issue is linked to Criteria and Indicators and also addresses new baseline data requirements.

2.3 Sustainable Resource Benefits

This issue addresses improved accounting of environmental and social values in land use planning and timber supply reviews.

A key issue in land use planning and timber supply reviews is properly accounting for environmental and social values along with economic values. There is a lack of decision support tools to model the effects of forest management alternatives in maximizing socio-economic resource benefits for multiple resource values and to meet standards for sustainability. Providing appropriate guidance and tools to

planners and decision makers will assist in achieving sustainable resource development and conservation. This issue is linked to Criteria and Indicators and Environmental Baseline Information.

3 Review Comments

FRBC nominated twenty individuals from provincial ministries, academia, research, and the forest industry (Appendix 4) to provide a technical peer review of the headquarters 2002-03 SSFM Issues and Strategies. The reviewers received the draft Issues and Strategies templates as well as an abbreviated version of this report. The responses represented comments from a cross-section of the reviewers (Table 1). To elicit frankness, respondents remain anonymous.

Reviewers were asked to comment on:

- Appropriateness of the 3 issues as provincial level issues.
- Completeness of the understanding of the issue (is there other information or facts you can add to improve the Template information?)
- Completeness of the strategies for addressing each of the issues. What other activities could be undertaken?
- Are there other activities you can suggest to address the issues?
- Other feedback that struck reviewers while reading

Table 1. Distribution of Technical Reviews Received

Organization	Number of Reviewers	Reviews Received
Provincial ministries	8	3
Academia, Research, Forest Industry	12	6
Total	**20**	**9**
FRBC (Distributed for information only)	7	n/a

The response rate was good given that at the time of this review, the provincial government was undergoing major reorganization and industry staff were dealing with poor market conditions and trade tariffs blocking exports to US markets.

3.1 Types of review comments

Review comments fell into three groups:

a) **Editorial comments**. E.g., improvements in wording, additional information provided, clarification required, etc.
b) **Comments on foundations of SSFM Issues and Strategies**. E.g., questions around priorities and fit with specific stakeholder needs.
c) **Other comments**. E.g., general comments requiring no edits or changes.

Comments in the first group were of an editorial nature and for the most part, the suggestions were incorporated into the Templates. Comments in the second group were directed at the fundamental foundations of the proposed SSFM issues and Strategies. As such, comments in the second group require a serious rebuilding of the Issues and Strategies. Instead comments in the second group form the basis for recommendations in this report. Comments in the third group required no edits or changes to the templates.

4 Recommendations

The headquarters planning team recommends three integrated SSFM Issues for FRBC consideration. These issues, stemming from issues raised in the previous fiscal year, provide the vehicle to carry on ongoing work. The three issues address strategic land use planning and timber supply reviews at a provincial level. Finally, the issues address three business drivers based on provincial government policy.

Following are additional recommendations on the planning process and the content of the HRMP.

4.1 Planning process recommendations

The following are recommendations on the HRMP-SSFM planning process

4.1.1 Enhance linkages with FRBC Regions

Each annual iteration of the RMP planning process provides the opportunity for closer coordination between headquarters and FRBC Regions. In future years, one or more headquarters SSFM issues could address knowledge gaps common across several regions or regional issues best dealt with by provincial level leadership. Headquarters coordination between regions could also reduce duplication of effort and increase efficiencies through cooperation.

4.1.2 Include stakeholder participation in government standards for forest management certification

Industry reviewers recommended that industry and stakeholder (certifying bodies) representatives participate in developing government standards for forest management certification. If government will develop standards for environmental information, then users should participate in that development. This may be addressed later in the detailed activities and project proposals. Buy-in begins with early participation.

4.1.3 Carefully define the management objective

In subsequent HRMP planning processes, the planning team should invest the time in discussing and refining the management objectives and performance indicators. Management objectives should describe, in the most basic words, the desired outcome of management. If the objective is properly framed, then investments will be better targeted to achieve what is fundamentally desired. In turn, performance indicators will more closely measure the values of interest. For instance, if the desired objective (e.g., achieve sustainable forest management) is difficult to measure, then an acceptable alternative is to step back and define a more attainable objective (e.g., maintain representative ecosystems). Representative ecosystems can be more easily defined and measured.

4.2 Content recommendations

The following are recommendations related to contents of the Issues and Strategies templates.

4.2.1 Performance indicators should measure the value of interest

The performance indicators need to measure the value of interest, for example environmental sustainability. Measuring environmental sustainability directly is not straightforward and the planning team proposes proxy measures. However, some measures, such as number of "map sheets produced" or "km of streams inventoried" are not good indicators of achieving environmental sustainability. There could be low correlation between km of streams inventoried and meaningful progress in achieving

sustainability. While not an easy task, performance indicators need to be more closely related to the main objective, e.g., environmental sustainability.

4.2.2 Assess underlying information in predictive models

An industry reviewer suggested assessing the quality of underlying information used in predictive models (e.g., Predictive Ecosystem Mapping). Part of SSFM is better and more efficient use of existing information. However, users questions the quality of the product if the underlying information is of uncertain quality.

Appendix 1

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See key, next page.

Key to Appendix 1

SSFM Component Leaders

*1 Standards for Criteria and Indicators to Support Forest Management Certification
*2 Towards an Environmental Baseline for Sustainable Forest Management
*3 Supporting Sustainable Resource Benefits in Strategic Planning Processes

Agency acronym

AGF	Ministry of Agriculture, Food and Fisheries
FOR	Ministry of Forests
FRBC	Forest Renewal British Columbia
LUCO	Land Use Coordination Office
SRM	Ministry of Sustainable Resource Management
WLAP	Ministry of Air, Land and Air Protection

Appendix 2a

Knowledge Issues and Strategies Templates #1 and #2 for Standards for Criteria and Indicators to Support Forest Management Certification

SSFM TEMPLATE 1: Key Issue #1

Strategic Objective: *Strengthening Sustainable Forest Management*	
Issue #:	**Title: Standards for Criteria and Indicators to Support Forest Management Certification**
Sub-issue #	**Title:**
HRMP Strategic Objective Component:	**Criteria and Indicators** (Leader: George Butcher) **Access to Information** (Leader: John Parminter)
Business Driver:	**Improve Access to World Markets** **Maintain Environmental Values**

Overview Description of the Provincial Level Issue:

This issue addresses lack of provincial government approved, and stakeholder accepted, standards for Criteria and Indicators of Environmental Sustainability used in various forest management certification systems.

Forest management certification is becoming a competitive factor in accessing world markets for BC forest products. Certification provides assurances that, among other principles, forest practices are environmentally sustainable. Currently 65.8 million hectares of forest land are certified in Canada either to ISO 14000, Canadian Standards Association Z808 96, Forest Stewardship Council, or other standards. Companies are working to certify more lands. Of the certified lands in Canada, 54% are in BC. Certification satisfies domestic and international market demand for assurances that the resource base is being managed in a sustainable manner.

The issue is lack of government approved, and stakeholder accepted, standards for Criteria and Indicators of environmental sustainability. While it is not government's role to certify forest operations, it does have the role of guiding the development and assessment of standards for these criteria and indicators used in certification systems. Addressing this knowledge issue will guide how environmental sustainability will be assessed and increase access to international markets for BC forest products. At this time, there is a lack of required standards.

Needs:

- Determine the required standards for criteria and indicators of environmental condition and sustainability. These indicators need to be easily understood and have wide acceptance among stakeholders.
- Develop methods to monitor rate of change in forests.
- Provide direction so that the correct information, and of sufficient quality, is being collected in the field to support Criteria and Indicators. Ensure data are credible and accessible to stakeholders.
- Improve access for decision makers to existing ecological and wildlife habitat information.
- Improve decision maker's understanding of and use of information on ecological and wildlife habitat values.
- Ensure the technology systems are in place to handle and synthesize the diverse types of Criteria and

Indicators data and knowledge. Ensure the information systems generate status reports on the Crite·. ·id Indicators. Ensure the data are accessible to all stakeholders. Ensure accessibility is supported by extension.

- Develop methods and tools to integrate the diverse types of information into unified Criteria and Indicators.
- Determine standards for monitoring environmental conditions.
- Provide measures to assess how well management objectives have been achieved.

The development of sustainability indicators will depend on the access to accurate environmental baseline and monitoring information. Close linkage to SSFM Issue #2 (Environmental Baseline Information) will ensure that knowledge gaps are filled and that access to useful information is improved.

Relationship to Strategic Level Objective:

i. The maintenance of environmental values

Creating standards for Criteria and Indicators to support forest management certification will ensure that the most appropriate and useful indicators are selected to reflect the context and scale of the environmental values to be protected. Standards for Criteria and Indicators will reduce the risk that the indicators are not ecologically relevant, hard to detect or lack sensitivity to change. Indicators will be developed with the best available scientific knowledge. Developing these standards will require stakeholder input.

ii. The sustainable use of timber resources

Having appropriate criteria and indicators for forest management activities will monitor our progress to the sustainable use of timber resources and will ensure alignment with prescribed certification needs and improve international acceptance.. Government standards will reduce the risk that certification bodies will not endorse the final suite of indicators and therefore reduce the uncertainty around market acceptance that industry faces. Standards will also reduce the risk that indicators may not be practical, cost effective or measurable on the ground.

iii. The sustainable use of non-timber resources

Significant risk to non-timber resources (e.g. water, botanical products) exists if criteria and indicators are chosen that are not sufficiently inclusive, not relevant or not sensitive enough to monitor trends over time. Having standards will reduce the risk of inconsistent data for non-timber resources across the landbase.

Relationship to Strategic Resource Plans and Decisions:

Describe how the issue relates to:

i. Strategic Decisions

Standards ensuring appropriate and stakeholder accepted indicators of sustainable forest management will help to:

1. reduce the uncertainty around the degree of acceptance/compliance with certification needs currently faced by strategic decision-making processes.
2. reduce the complexity of the strategic decision-making

ii. Resource Plans

Indicators developed for certification can be used for planning and will facilitate the familiarity with and acceptance of the plans. Standards will help make indicators consistent across different levels of planning and will improve the planning process.
Cross Reference to other Provincial or Regional Issue or sub-issue (if applicable):
Links to: Develop Objectives and Targets for Conservation Define the Effective Forest Land Base

Note: One Strategy follows below.

SSFM TEMPLATE 2: Issue Strategy #1.1

Issue #:	**Title: Standards for Criteria and Indicators to Support Forest Management Certification**
Knowledge Strategy	**TITLE: STANDARDS FOR CRITERIA AND INDICATORS**
HRMP Strategic Objective Component:	**Criteria and Indicators** (Leader: George Butcher) **Access to Information** (Leader: John Parminter)
Business Driver:	**Improve Access to World Markets** **Maintain Environmental Values**

Overview Description of the Issue Strategy:

The strategy is to develop, test and implement indicators of biodiversity, water and watershed condition for different spatial and temporal scales that can become thresholds for sustainable forest management and accepted standards for forest certification. This will consist of 1) defining the characteristics of effective indicators and developing a framework of standards for evaluating indicators, 2) assessing the status of existing methods and indicators, 3) identifying and filling information gaps, and 4) creating analytical methods and indicators that meet the standards and achieve stakeholder buy-in. Much of the data already exist for indicator development; however, some new procedures and methods are expected to be required.

Status of Existing Knowledge:

i. Organization, synthesis and analysis

Some criteria and indicators for sustainable forest management have been developed through the Canadian Council of Forest Ministers for use at a national and international scale. Local level indicators have been developed and reported on from all of the Canadian Model Forests including the McGregor Model Forest and the Long Beach Model Forest. To date the Province has conducted some preliminary work and has created indicators for the implementation of the Kamloops LRMP and for LUPs. State of Environment Reporting has developed and reported on a set of forest biodiversity indicators since 1998 In many cases we have the data but lack the analytical tools and the interpretative skills.

ii. Data Management:

Existing provincial data are available from a variety of RIC Inventory databases as well as from State of Environment Reporting databases. Additional new data may be required.

Currently, there is a lack of trend information or an inability to use existing data to determine trends (as required for indicators).

Data from demographic, social, economic sources will be needed for integration with resource and environmental data.

Much effort will be required to bridge from the raw data to indicators using analytical tools and procedures.

iii. Research: has research already been conducted for this issue?

Academic research has been conducted; however it has not been applied to our provincial needs. FRBC funded the research to develop the forest biodiversity indicators reported in Environmental Trends in British Columbia 1998 and 2000. These indicators are being updated

for Environmental Trends in British Columbia 2002. A review of the literature is needed and is being conducted this fiscal by Risa Smith (Criteria and Indicators–Review of Indicators for Sustainable Forestry). This work will advance our readiness to proceed by analysing what analytical tools are in use and how the data are being used as indicators for sustainable forest management. Ministry of Forests is currently developing indicators for its State of the Forests report (Tom Niemann is the contact). Some unknowns may also be answered by the Brown/Dick report and the Environmental Baselines report (Kenk).

iv. *Adaptive Management:*

Past implementation efforts have not been effectively monitored. It is not well known how information provided to decision processes was used or what the impediments to effective use were.

v. *Effectiveness Evaluation: has the cost or resource use effectiveness of past implementation efforts been evaluated?*

No

vi. *Extension:*

Some extension work relative to indicators for sustainable forest management has been done by the Canadian Model Forest Network. Ministry of Forests has done considerable extension work on adaptive forest management, (Brian Nyberg is the contact) which is an important part of sustainable forest management indicator development

There is need for a registry of indicators to provide consistent application of indicators, e.g. roll-up indicators from the local/regional levels to provincial SOE reporting.

What is the current format of information relative to the needs of various users and stakeholders?

Describe the Required Activities in these Areas (as applicable):

1. Develop a vision for the use of Criteria and Indicators for sustainable forest management. Encourage early stakeholder participation and buy-in to the process.
2. Catalogue existing indicators
3. Determine critical information requirements of the decision processes
4. Define the desired characteristics of criteria and indicators and develop a framework of standards for evaluating indicators
5. Condense down the list of potential indicators
6. Identify gaps
7. Propose / create analysis methods to support new indicators
8. Obtain new data; test and implement new analytical methods
9. Monitor indicators for change and test suitability of indicators in an adaptive management process
10. Provide extension; provide agency and stakeholder access to information, knowledge, and tools.

Define Performance Indicators, Targets & Milestones:

Targets

- Complete Vision

• Prepare framework of standards • Complete gap identification • Complete evaluation of new methods and indicators • Secure stakeholder participation and buy-in
Describe Relationship to Other Strategies (if applicable): *Linked to : Environmental Baseline Information*
Cross Reference Activities to other strategies as applicable:

Appendix 2b

Knowledge Issues and Strategies Templates #1 and #2 for Towards an Environmental Baseline for Sustainable Forest Management

SSFM TEMPLATE 1: Key Issue #2

Strategic Objective: *Strengthening Sustainable Forest Management*	
Issue #:	**Title: Towards an Environmental Baseline for Sustainable Forest Management**
Sub-issue #	**Title:**
HRMP Strategic Objective Component: Environmental Baseline (Leader: Colleen McKendry)	
Business Drivers:	**Improve Access to Timber** **Maintain Environmental Values**

Overview Description of the Provincial Level Issue:

This issue addresses the lack of knowledge on environmental baseline information to assess sustainable forest management.

There is the risk of inconsistency in the quality of environmental baseline information across the province without a consistent system of collecting that data. Addressing this issue is will assess the current baseline coverage for the indicators of sustainability and develop tools, techniques and action plans that fill priority gaps with maximum use of existing data as well as any new information that is required.

This component supports Forest Renewal BC's Strengthening Sustainable Forest Management strategic objective by developing knowledge and tools required to measure existing forest ecosystem conditions and processes of change in a consistent manner. This information is essential for determining sustainability, and in particular is an important input into successful application of SFM Criteria and Indicators.

Relationship to Strategic Level Objective:

This issue relates to reducing risk or uncertainty regarding:

i. *The maintenance of environmental values*

Existing information contributes to support management of timber and non-timber values (i.e. biodiversity and improved habitat for plants, wildlife and other organisms). In not continuing the work, we will not be able to provide quality and standard information for Timber Supply Reviews and land use planning (e.g., LRMPs and Landscape Unit Plans) that is consistent and comparable over time. This will create uncertainty and risk for long term timber and non-timber supply.

ii. *The sustainable use of timber resources*

Without accurate Environmental Baseline and Monitoring Information, there is increased risk of overcutting, undercutting, and forest development related impacts. In particular there is a high level of risk and uncertainty in predicting the current and future harvest levels as the baseline information drives the planning processes. Any initial inconsistencies or errors are propagated through the planning cycle. There are also financial risks associated with investing in silvicultural, enhanced and innovative practices across the province with inconsistent baseline information.

iii. The sustainable use of non-timber resources

Consistent and quality Environmental Baseline information forms the basis for measuring and sustaining non-timber resources. As is the case for the timber resources, the sustainable use of non-timber resources can be greatly improved with consistent and accurate baseline information.

Relationship to Strategic Resource Plans and Decisions:

i. Strategic Decisions

Accurate and consistent timber and non-timber information is essential to land use planning and decision making processes including the Chief Forester's determinations of AACs. Having quality information as a starting point decreases the uncertainty in setting initial harvest levels and thereby reduces the risk of over or under-cutting. It also decreases the uncertainty in setting conservation targets for environmental and wildlife values and reduces the risk of degrading those values or habitats. By setting AACs that are reflective of the resource, the public (local, national and international) is provided with an assurance that we are managing our timber and non-timber resources in a sustainable and responsible manner. Resolution of the issue will lead to more accurate timber supply projections that are central to the determination of AACs, certification and sustainable resource management.

ii. Resource Plans

Accurate baseline information will greatly improve all resource plans.

AAC determinations must be completed every 5 years so there is a need to supply the best possible and consistent baseline information to the TSR process. Incremental improvements can be made through adopting an adaptive management system.

Cross Reference to other Provincial or Regional Issue or sub-issue (if applicable):

This component complements and facilitates regional investments by defining environmental baselines, describing standards and providing a foundation for risk analysis and prioritization to fill gaps.

Note: Two strategies follow for this issue, 2.1 and 2.2.

SSFM TEMPLATE 2: Issue Strategy #2.1

Strategic Objective: *Strengthening Sustainable Forest Management*	
Issue #:	**Title: Towards an Environmental Baseline for Sustainable Forest Management**
Sub-issue #	**Title: Identify provincial environmental SFM baseline data and gaps**
HRMP Strategic Objective Component: Environmental Baseline (Leader: Colleen McKendry)	

Overview Description of the Issue Strategy:

This Issue Strategy will:

- Review existing baseline data coverage for known and proposed indicators for both timber and non-timber resources;
- Define standards for establishing environmental baselines including missing indicators, incorporating results of review;
- Carry out a gap analysis to identify missing baselines and data; and
- Develop an action plan for filling priority gaps, including establishment or enhancement of information collection systems and equipment.

Sequencing is important:

1. Identify the scope of what we are responsible for (timber, non-timber, etc, who are the players?)
2. What indicators are required to meet identified business needs and what baseline data meets those?
3. What new indicators and data are needed from a gap analysis?

Status of Existing Knowledge:

The status of existing knowledge in this area is as follows:

i. Organization, synthesis and analysis:

RIC has been pivotal in developing and defining provincial standards for the collection of resource inventory information (timber and non-timber) and for providing this information in accessible forms. These standards need to be managed and refined as information needs change.

ii. Data Management:

Work is currently underway to develop a coordinated resource management data warehouse. Existing data are currently stored in various forms, from hardcopy reports to spatially explicit datasets. Resource information exists in various scales, from provincial level down to stand level. Much of this data and information is not referenced in a manner than allows for efficient and effective use or further analysis when combined.

iii. Research:

The Canadian Forest Service (NRCAN) has been, over the last 3 years, actively researching and developing a series of national criteria and indicators based on the Montreal process. Through the model forest network, notably Eastern Ontario and Foothills Model forest local and regional indicators have been adopted which closely enable the establishment of baseline information measures against know forest practices.

The Canadian Council of Forest Ministers have also developed a list of criteria and indicators. The Ministry of Sustainable Resource Management's Change Management project did not start until indicators were identified. Once done, the data capture programs were developed around them.

iv. Adaptive Management:

A number of model forests in Canada are currently piloting a series of baseline initiatives to measure the impact of forest practices on lands base. Principally achieved through the establishment of a monitoring systems to measure a specific set of activities against a known set of performance indicators.

v. Effectiveness Evaluation:.

This needs to be undertaken

vi. Extension:

Much of the current information is not readily accessible to all users or stakeholders. Efforts through extension are required.

Describe the Required Activities in these Areas (as applicable):

Organization, Synthesis, Analysis:
Develop strategies and priorities for utilizing existing and/or collecting new Environmental Baseline information. Where applicable, coordinate with FRBC Regions.

Data Management:
Modify, develop or support existing tools to provide effective and consistent data management. This includes identifying data needs; assembling all relevant data sets; working with the regions to plan and coordinate the capture of new data; and improving access to information by providing the data on web-enabled servers.

Research:

Adaptive Management:
Build a forest management system based on an adaptive management framework.

1) Baseline information: Develop techniques and tools to identify, select and monitor measurable forest attributes to ensure compliance between planned objectives and actual performance.. Review baseline measurements and modify as needed to be sensitive to environmental changes.

Effectiveness Monitoring:

Extension:
See Knowledge Strategy 2b below

Define Performance Indicators, Targets & Milestones:

Performance indicators should give an indication of how well environmental sustainability is being achieved. Targets and performance indicators can include:

- Number of gaps in baseline information identified;
- Number of completed standards for establishing environmental baselines; and
- Number of protocols developed that support data capture.

Milestones can include:

- Review of baseline data coverage completed;
- Achieving provincial and stakeholder agreement on Criteria and Indicators and data requirements;
- completing standards for establishing baselines;
- Making available tools, techniques, and processes for tracking spatial and temporal indicators;
- Completing gap analysis for missing baselines and data; and
- Completing action plan for filing priority gaps.

Describe Relationship to Other Strategies (if applicable):

This strategy supports Criteria and Indicators and Access to Information. It also supports Sustainable Harvest Goals and parts of the growth and yield strategy.

Cross Reference Activities to other strategies as applicable:

SSFM TEMPLATE 2: Issue Strategy #2.2

Issue #:	**Title: Towards an Environmental Baseline for Sustainable Forest Management**
Knowledge Strategy #	**Title: Develop tools to improve access to baseline information**

HRMP Strategic Objective Component: Environmental Baseline (Leader: Colleen McKendry)

Business Drivers: **Improve Access to Timber**
Maintain Environmental Values

Overview Description of the Issue Strategy:

This strategy will:

- deliver the environmental baseline information to stakeholders;
- involve developing tools, techniques and processes to enable maximum use of existing data and data collection systems, including business-related data, in support of sustainable forest management;

Status of Existing Knowledge:

Describe the status of existing knowledge in this area in order to provide a rationale for:

i. *Organization, synthesis and analysis: what tools or analysis capability already exists?*
RIC has been pivotal in developing and defining provincial standards for the collection of resource inventory information (timber and non-timber) and for providing this information in accessible forms. These standards need to be managed and refined as information needs change.

ii. *Data Management: what is the state of existing data?*
Work is currently underway to develop a coordinated resource management data warehouse. Existing data are currently stored in various forms, from hardcopy reports to spatially explicit datasets. Resource information exists in various scales, from provincial level down to stand level. Much of this data and information is not referenced in a manner than allows for efficient and effective use and further analysis when combined.

Some application tools have been developed for "user friendly" access to information e.g., Fish Wizard, InView FC1/FIP Viewer, Conservation Data Centre. More tools of this nature need to be developed.

iii. *Research: has research already been conducted for this issue?*

iv. *Adaptive Management:*

Effectiveness Evaluation:
This needs to be undertaken.

Extension: what format is the information in relative to the needs of various users and stakeholders?

Existing data are currently stored in various forms, from hardcopy reports to spatially explicit datasets. Some of the information is available on web sites, but there is a need to make more information more accessible. As noted above, resource information exists in various scales, from provincial level down to stand level. Much of this data and information is not referenced in a manner than allows for efficient and effective use and further analysis when combined.

Describe the Required Activities in these Areas (as applicable):

- Identify need for specific tools to access information
- Identify tools currently available and their applicability (e.g., correct scale, provincial versus local situations).
- Update and assess currently available tools where required.
- Develop new tools as required.
- Assess and evaluate tools/models with respect to effectiveness, local accuracy and risk (further updates as required).
- Extension (e.g., workshops, publications/manuals, ready access to tools by agencies and stakeholders). Training is an important part of extension in order to ensure planners and decision makers are trained to use decision support tools.

Define Performance Indicators, Targets & Milestones:

Performance Indicators:

- Number of new tools/models/procedures developed
- Number of existing tools/models/procedures verified

Milestones include:

- Verifying and identifying uncertainty in current models
- Pilot of the process in certain management units.

Describe Relationship to Other Strategies (if applicable):

This strategy is dependent upon Knowledge Strategy 2a above (Identify provincial environmental SFM baseline information and gaps). Development and testing of models requires data and information. There is currently a large amount of data in non-accessible forms (e.g., paper, unlinked isolated data sets) that could be better utilized.

Cross Reference Activities to other strategies as applicable:

Appendix 2c
Knowledge Issues and Strategies Templates #1 and #2 for Supporting Sustainable Resource Benefits in Strategic Planning Processes

SSFM TEMPLATE 1: Key Issue #3

Strategic Objective: *Strengthening Sustainable Forest Management*	
Issue #:	**Title: Supporting Sustainable Resource Benefits in Strategic Planning Processes**
Sub-issue #	**Title:**
HRMP Strategic Objective Component:	**Sustainable Resource Benefits** (Leader: Tony Cheong) **Access to Information** (Leader: John Parminter)
Business Drivers:	**Improve Access to Timber** **Maintain Environmental Values**

Overview Description of the Provincial Level Issue:

This issue addresses improved accounting of environmental and social values in land use planning and timber supply reviews.

A key issue in land use planning and timber supply reviews is properly accounting for environmental and social values along with economic values. There is a lack of decision support tools to model the effects of forest management alternatives in maximizing socio-economic resource benefits for multiple resource values. Providing appropriate guidance and tools to planners and decision makers will assist in achieving sustainable resource development and conservation.

More specifically, planners face several issues. First much of the required environmental and social information comes from diverse sources and exists in varied formats. This information is not easily synthesized nor interpreted spatially across the land base. A means is needed to compile and make the diversity of information useful. Secondly, Multiple Accounts Analysis is one appr· ·ch to dealing with the range of resource values. However, issues around supporting MAA include difficulty in quantifying non-timber resources and lack of tools to assist decision makers in assessing the implications trade-offs between land use alternatives. Third, existing ecological and wildlife habitat information are not readily accessible nor in useful forms. Land use planning and timber supply analysis will be supported by addressing these knowledge issues.

Relationship to Strategic Level Objective:

Describe how the issue relates to reducing risk or uncertainty regarding:

i *The maintenance of environmental values*

Planning and decision making will be aided by incorporating the best current knowledge on ecological and habitat resources. As increasing amounts of information are incorporated into the forest planning process, risks around uncertainty can be quantified and minimized.

ii *The sustainable use of timber resources*

Significant risk exists for the sustainable use of timber resources if environmental resource values are not adequately defined and considered in planning. These risks include:

- *Over or under estimation of the amount of available timber on a sustainable basis.*
- *Potential for future removal of areas from the land base due to unforeseen circumstances (e.g., newly located fish streams or Identified Wildlife habitat areas).*
- *Inaccuracies in identifying land base boundaries due to lack of spatial representation of key data.*

Improved tools and the inclusion of all timber and non-timber resource values is necessary for ensuring a sustainable flow of timber.

iii. The sustainable use of non-timber resources

Significant risk to the sustainable use of non-timber resources (e.g., fish, terrain) exists. At this time there is no consistent method to maximise the environmental and socio-economic resource benefits for multiple values. Without the inclusion of spatially-explicit, accurate non-timber resource information or decision-support tools, these risks will continue to exist.

Relationship to Strategic Resource Plans and Decisions:

Describe how the issue relates to:

i. Strategic Decisions

Better incorporation of environmental and social resource information and values will improve strategic decision making processes by:

- Providing a standard assessment approach for key resource values across the province;
- Accurately identifying all timber and non-timber resources;
- Creating a procedure (Multiple Account Analysis) by which to assess multiple values;
- Decreasing uncertainty and risk in the planning and decision making process.

ii. Resource Plans

Addressing this knowledge issue will help guide resource plans by providing an accurate account of forest resources in landuse planning analyses and in a spatially explicit Timber Supply Reviews. Risk and uncertainty in the planning process will be clarified through the input of more accurate, spatially referenced information. Quantification of forest resources and decision-support tools will allow planners to more effectively balance interests in multiple-resource use areas. In addition, addressing these issues will assist the Ministry of Sustainable Resource Management in meeting its mandate to integrate and deliver resource information in a timely fashion.

Cross Reference to other Provincial or Regional Issue or sub-issue (if applicable):

Links to: Maintaining Environmental Values / Objectives and Targets for Conservation
Standards for Criteria and Indicators to Support Forest Management Certification
Spatially Explicit TSA

Note: Two strategies follow, 3.1 and 3.2

SSFM TEMPLATE 2: Issue Strategy #3.1

Issue #:	**Title: Supporting Sustainable Resource Benefits in Strategic Planning Processes**
Knowledge Strategy	Title: **Improve use of information**
HRMP Strategic Objective Component:	**Sustainable Resource Benefits** (Leader: Tony Cheong) **Access to Information** (Leader: John Parminter)
Business Drivers:	**Improve Access to Timber** **Maintain Environmental Values**

Overview Description of the Issue Strategy:

To better incorporate environmental and social resource values in forest planning, there are many pieces of data, information and knowledge required. These range from forest cover data, locations and values relating to fish and fish habitat, to the cost of silviculture techniques. Currently, these data exist in various forms (e.g., databases, hardcopy reports, expert knowledge) and at various scales or level of detail. To efficiently and effectively acquire the information necessary for land use planning, three main steps must be taken. First, the information requirements must be identified (what data are needed). Second, the data must be acquired. This includes amalgamating existing information and identifying where further information collection is necessary. Third, converting this data to accessible forms (e.g., databases with common identifiers).

Status of Existing Knowledge:

Describe the status of existing knowledge in this area in order to provide a rationale for:

i. *Organization, synthesis and analysis: what tools or analysis capability already exists?*

Some tools and procedures have been developed to make certain data accessible (e.g., Fisheries Inventory Summary System (FISS); Forest View; Water Quality Data Management System), and others are in development (i.e., the Ministry of Forests Integrated Corporate Spatial and Attribute Database). However more work is required to develop processes so that all necessary resource data are available and accessible. The Resources Inventory Committee (RIC) has taken the lead on developing provincial standards for resource inventory data collection and dissemination.

ii. *Data Management: what is the state of existing data?*

Existing data is stored in various forms – from hardcopy reports to spatially explicit datasets. In some cases data is provincial (e.g., Forest Cover Inventory data, FISS) and in some cases, data are for discrete areas and at various scales (terrain mapping, wildlife habitat). Much of this data are not referenced in a way that allows for efficient and effective use when combined.

iii. *Research: has research already been conducted for this issue?*

iv. *Adaptive Management: have past implementation efforts been effectively monitored?*

FRBC and RIC have been pivotal in defining provincial standards by which to inventory timber and non-timber resources, and providing them in accessible forms. Where necessary, some historical data have also been incorporated into the available datasets. Through the

Resource Management Plans, gaps in regional knowledge have been identified. However, from a provincial point of view, gaps still exist as priorities for the type of data collected (e.g., wildlife, fish, water) vary from region to region.

v. *Effectiveness Evaluation: has the cost or resource use effectiveness of past implementation efforts been evaluated?*

Broad-level analyses comparing the costs of past efforts versus maximizing resource information in a multiple values analysis has generally not been undertaken. Questions exist as to what pieces of information are required, the level of detail required, and the quality of the product..

vi. *Extension: what format is the information in relative to the needs of various users and stakeholders?*

Much of the current information is not readily accessible to all users or stakeholders.

Describe the Required Activities in these Areas (as applicable):

1) Identify a common scale/base map with which to map and analyse the data.
2) Identify the data/criteria/surrogates required for the analyses.
3) Assess current data for: form, spatial coverage/extent (provincial, local), accuracy, weaknesses, strengths, and limitations.
4) Get data in accessible form, including common identifiers/links between datasets.
5) Identify methods to assess values (resource/environmental, social, economic).
6) Analyse information (see SSFM Knowledge Issue #2, Environmental Baseline Information).
7) Link with Resource Management Plans to fill in gaps in data to decrease uncertainty.
8) Improve agency and stakeholder access to information, knowledge, analyses.
9) Evaluate and Assess.
10) Report and provide extension.

Define Performance Indicators, Targets & Milestones:

Targets and indicators can include:

- Number of data sets digitally available (Access to Information, see Strategy 3b below)
- Number of map sheets/area covered, by data set
- Total area with inventory data available

Milestones include:

- Identifying and detailing a common base
- Linking all attribute/spatial data sets
- Performing a gap analysis

Describe Relationship to Other Strategies (if applicable):

This strategy is linked to: Criteria and Indicators
Environmental Baselines.
Key Component for Knowledge Strategy 2.

Cross Reference Activities to other strategies as applicable:

SSFM TEMPLATE 2: Issue Strategy #3.2

Issue #:	**Title: Supporting Sustainable Resource Benefits in Strategic Planning Processes**
Knowledge Strategy #	**Title: Develop analysis tools to improve use of information**
HRMP Strategic Objective Component:	**Sustainable Resource Benefits** (Leader: Tony Cheong) **Access to Information** (Leader: John Parminter) **Criteria and Indicators** (Leader: George Butcher)
Business Drivers:	**Improve Access to Timber** **Maintain Environmental Values**

Overview Description of the Issue Strategy:

This strategy is related to the "Improve Use of Information" strategy 3a above.

This issue strategy will:

a) enhance, consolidate and adapt models that forecast attributes for timber and non-timber resources;
b) model ecosystem and biodiversity attributes as indicators of ecosystem condition;
c) develop techniques for spatially-explicit resource analysis that will not only improve the quality of planning processes (e.g., Timber Supply Reviews), but will enable more explicit and appropriate representation of habitat and biodiversity values in resource analysis.

Status of Existing Knowledge:

Describe the status of existing knowledge in this area in order to provide a rationale for:

i. Organization, synthesis and analysis: what tools or analysis capability already exists?

Some tools exist to extrapolate assessments to unsampled areas (e.g., Fish Habitat Assessment Tool and Caribou habitat suitability models) but different tools produce results at different scales, and not all tools are spatially-explicit. They, as well as other more provincial-scope models such as EcoGen, require verification and field validation. A number of projects in the current fiscal Headquarters Resource Management Plan are addressing some of the model development needs. Currently, there is no central group/agency coordinating the development of models.

ii. Data Management: what is the state of existing data?

Work on specific models and associated data is proceeding with respect to certain environmental attributes (e.g., caribou and fish). Data for other non-timber resources (e.g., water and terrain) and associated models and tools, are lacking.

iii. Research: has research already been conducted for this issue?

Some models (e.g., Timber Supply models, Fish Habitat Assessment Tool, EcoGen) have been developed. Few have been rigorously evaluated. Further research is required to identify uncertainty and risks in the currently available models, as well as develop new models/ analyses (e.g., Multiple Accounts Analysis to maximize the socio-economic resource benefits for multiple values).

iv. Adaptive Management:

Improved data analysis (e.g., modelling) for certain resources have resulted from

recommendations that have come out of past efforts at multiple resource planning (i.e., the Timber Supply Review).

Effectiveness Evaluation:
Certain effectiveness evaluations have been done (e.g., for Predictive Ecosystem Mapping/Terrestrial Ecosystem Mapping analyses) and some are underway (caribou and grizzly models, Fish Habitat Assessment Tools, timber supply models). Resource Management Plans have identified further need for evaluation and testing (more specifically, their accuracy at the local level).

Extension: what format is the information in relative to the needs of various users and stakeholders?
Not all models and procedures are available for use with respect to the provincial scope (e.g., different scales, local applicability, etc.)

Describe the Required Activities in these Areas (as applicable):

- Identify need for tools (e.g., multiple accounts assessment procedures and models to extrapolate inventory data).
- Identify tools currently available and their applicability (e.g., correct scale, provincial versus local situations).
- Update and assess (e.g., verification, field validation) currently available tools where required.
- Develop new tools as required.
- Assess and evaluate models with respect to effectiveness, local accuracy and risk (further updates as required).
- Extension (e.g., workshops, publications/manuals, ready access to tools by agencies and stakeholders). Training is an important part of extension in order to ensure planners and decision makers are trained to use decision support tools.

Define Performance Indicators, Targets & Milestones:

Performance Indicators:
- Area analysed
- Number of new models/procedures developed
- Number of existing models/procedures verified

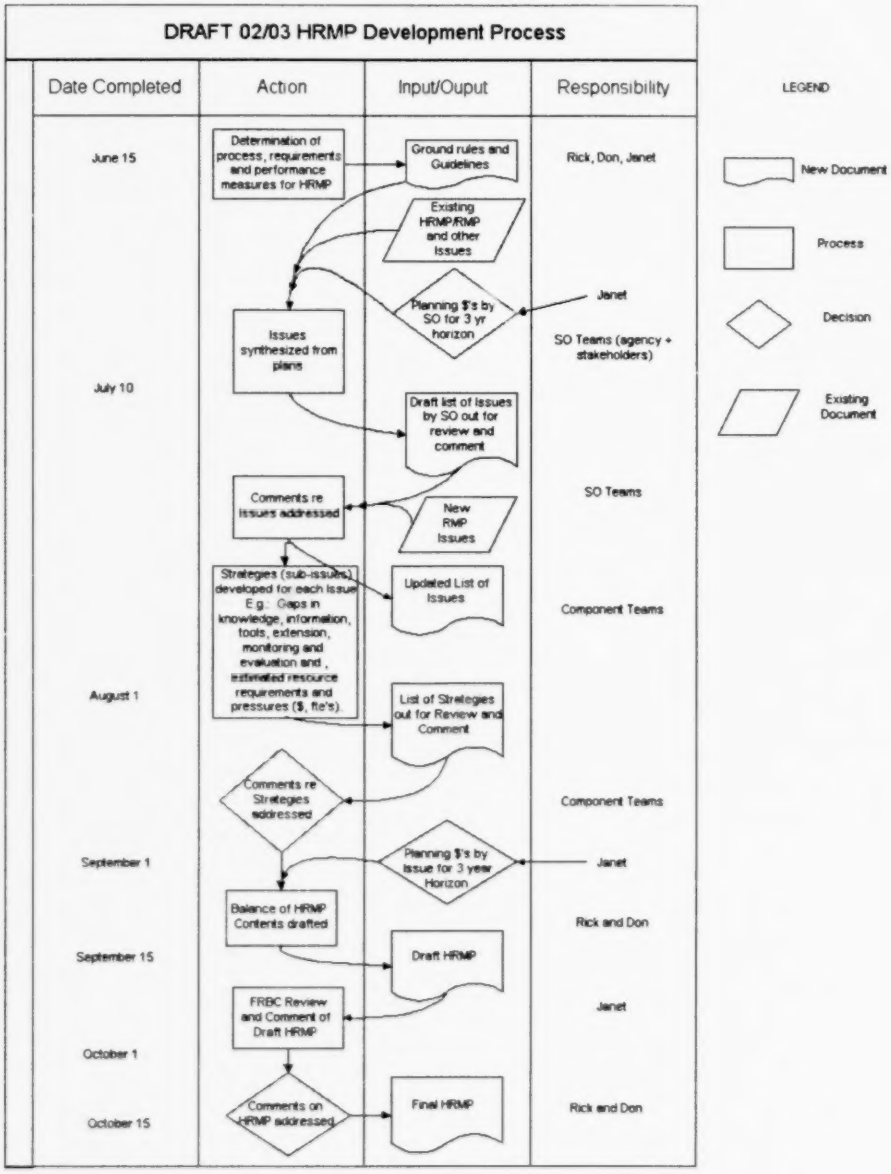
Milestones include:
- Verifying and identifying uncertainty in current models
- Development of a Multiple Accounts Analysis
- Pilot of the process in select management units.

Describe Relationship to Other Strategies (if applicable):

This strategy is dependent upon Knowledge Strategy 3a above (Improve Use of Information). Development and testing of models requires data and information. There is currently a large amount of data in non-accessible forms (e.g., paper, unlinked isolated data sets) that could be used.

Cross Reference Activities to other strategies as applicable:

Appendix 3. HRMP SSFM 2002-2003 Planning Process



Appendix 4. 2002-03 SSFM Technical Peer Reviewers

Ministries	
Mike Connor	Forests
Ruth Edwards	Forests
Kathy Eichenberger	Water Land Air Protection
Les Herring	Forests
Ray Leduc	Forests
Bernie Peschke	Forests
Don Reid	Water Land Air Protection
Leslie Yaremko	Water Land Air Protection
Academia, Research, Forest Industry	
Jay Baker (Silvacon Services Ltd)	West Fraser
Geoff Bekker	Pope and Talbot
John Brockley	Canfor
Dave Brown	Crestbrook/Tembec
David Byng	Western Forest Products
Glen Dick	Riverside
Keith Dufresne	Inland Timber
John Innes	FRBC Chair, UBC
Joe Kavanagh	Canfor
Nick Kleyn and Pat Salm	Weyerhaeuser
Diane Medves	Weyerhaeuser
Bill Wilson	Forestry Canada
FRBC	
Joyce Beaudry	Ominica- Peace
Ron Bronstein	Pacific
Rob Gay	Kootenay-Boundary
Stan Gripich	Cariboo-Chilcotin
Bill Jensen	Ominica-Peace
Butch Morningstar	Skeena-Bulkley
Chris Ortner	Thompson-Okanagan

Appendix 5 Summary of Review Comments

The following are verbatim comments from reviewers. The comments are presented in three groups. The first are comments of an editorial nature and for the most part, the suggestions were incorporated into the Templates. Comments in the second group are directed at the fundamental foundations of the SSFM issues and Strategies. As such, comments in the second group would have required building the Issues and Strategies from the ground up. Instead comments in the second group are discussed in the recommendations section of this report. The third group of comments required no edits or changes. The reviewers remain anonymous.

1. Editorial Comments

Comment #1
Reviewer Group: Ministry
Addressed by: Sentence reworded
Comment: I have reviewed the HQ RMP For SSFM for 2003-03. I have very few comments to make. One suggestion for change is to <Issue Strategy 3.1> in the required activities box under # 3, I would like to see this reworded to (underlined):

3) Assess current data for: form, spatial coverage (provincial/local), accuracy, weaknesses, strengths, limitations.

Comment #2
Reviewer group: Ministry
Addressed by: Edit suggestions incorporated.
Comment: My overall impression of the draft headquarters SSFM RMP is that I agree in principle with the outlined Provincial initiatives, and it looks like you did a good job of describing the ideas and proposed activities. I have inserted a few comments inside the document. Also, in reading the draft plan the theme of access to information reminded me of a report that was done in our region a few years ago, which discusses tools to use inventory information. In the second attachment I have copied some of the highlights from the report for your consideration for inclusion into your draft RMP.

Comment #3
Reviewer group: Research/Academia/Forest Industry
Addressed by: Edit suggestions incorporated
Comment: Numerous edit suggestions:

Issue #1. Criteria and Indicators: in issue description, include "*...and industry accepted*" standards.

The issue is not what barrier there is <to certification>, as many companies as per your preamble have been getting registered and certified already. The issue is a consistent process with buy in from all parties <to the certification standards>.

It is "...not agreement <by stakeholders> but buy-in based on participation from the stakeholders" that is needed.

In list of activities (Template 1.1), move "stakeholder buy-in" from activity #6 to be part of activity #1, i.e., "Develop a vision".

<Re: Baseline Inventories> I am confused with this statement regarding measuring, a baseline is just that, the beginning of measurement process, the type of measurement will be different for all the different types of baselines. What is true is that all SFM baselines need to be identified.

2. Comments on foundations of SSFM issues and Strategies

Comment #4
Reviewer group: Research/Academia/Forest Industry
Comment: ...seems to me to be less focused on certification and more on provincial sustainability, and monitoring of performance. This is important from an international customer perspective but provincial monitoring data developed and monitored by gov't has not in the past been seen to be credible internationally. We would use any solid indicators in our voluntary certifications that fell out of any process, this one included. The greatest deficiency is that with provincial and regional scale indicators is their application at the local forest level, particularly the socio economic ones such as employment rates, average personal income, and broad environmental ones such as air and water quality indices. To be meaningful, indicators should be measured at the local level and rolled up at the provincial level. This of course would take all kinds of inter gov't ministry co-operation and commitment. The proposal does point to another deficiency which is the lack of baseline information. Currently the LRMP and provincial indicators I am familiar with are simply a reporting of current state but do nothing as a measure of effectiveness in achieving a set, desired outcome.

As you can see, our basic concern / question would be what benefit it would provide. When we evaluate potential FRBC projects (or Issues / Strategies) we ask the question "what benefit to <our company>?". In our current FRBC program, about half of the expenditure in our work plan has some benefit to us. The remainder addresses a number of other drivers, but primarily addresses the "use it or loose it" aspect of the present program with it's various agendas. With a much changed, smaller and more focussed program in the future, we would be far more judicious about funding certain activities.

Comment #5
Reviewer group: Ministry
Comment: The emphasis seems to be around make data accessible, development of tools and models, assessing accuracy of models etc. Without understanding how the data was collected and the limitations of the data. the use of new tools and models could lead to misleading predictions etc. I would expect that a thorough analysis of the data will identify some major gaps that need to be addressed that will enhance the credibility of new tools and models..

Comment #6
Reviewer group: Research/Academia/Forest Industry

Comment: Observations: no industry stakeholders on your list of those who developed the templates. This appears to be a government run process, you need industry buy in to the process for it to work. Too many government projects in the past have failed, not because it was a bad idea, but because it never had buy in from the user groups. What usually happens is the idea is resurrected a couple of years later and tried again in some different capacity, when all either really needed was input and buy in from the user group. In forestry, in many instances this means industry input as well as other stakeholder input.

The idea behind the three templates is great, but unless you involve industry stakeholders you will never get buy in to the process. You will get agreement that it should be completed, but it may never be utilized. There are three ways to get something done, 1) wish it would get done, doesn't work.; 2) impose your will, doesn't work well and usually ends up in another process to develop an even better process because the last one didn't work as well you thought it would. 3) Have buy in to process, this usually results in the objective being completed with an enthusiasm to start the next project.

There seems to be confusion around what an *objective* is this should be reviewed.

I get concerned when I see RIC standards. RIC has become synonymous with over engineered standards which in turn result in very costly standards. I would urge you to keep you objectives well in focus when developing your standards, of course in conjunction with stakeholders, to get buy in.

RIC has become synonymous with over engineering and costly. Standards should be developed to meet true objectives (see SMART objective <below>) with buy in from the stakeholders, they should not include lots of Ministry add-ons <just> because there would be no other way to collect data for their interests

If you define your management OBJECTIVE correctly you should not need to establish methods and tools <to measure performance>. An objective should be *SMART* (Specific, measurable, Attainable, Realistic, and Timebound) if your objective is written so that you need methods and tools, then it is a very poor objective (i.e. it is not an objective).

The required activity "*develop sophisticated modelling and forecasting tools to assess likely implications of different management strategies on forest environment and different values*" (Template 2.1) seems to be way out front, a tool to help make decisions should be made on a case by case basis. We have been getting along fine for a long time making decisions on our assessments of data. There are cases where we need sophisticated modelling tools, but these are for specific issues, the statement above is way too general.

...an indicator should be used to help us gauge if we are on track to meet our objective, unless you have a smart objective, which I do not think has been defined yet, you can't determine adequate indicators to determine if you are on track to meeting your objective. <comments that indicators based on "number of maps produced" are not indicative of achieving sustainability>.

Because <an approach> is "cost effective" does not mean we have gotten our moneys worth, it might mean we have just wasted $100,000. I have reviewed some of the $100,000 PEM projects, which are essentially a reworking of existing data. It does not meet my objective of starting with a good baseline of data, which bioterrain PEM or TEM does. You cant compare PEM with TEM. Garbage in-garbage out.

Comment #7
Reviewer Group: Research/Academia/Forest Industry
Comment: Here are my general thoughts:
Issue #1. Standards for criteria and indicators of environ sustainability. Why does government want to get involved with this when the industry is already dealing with ISO and CSA certification and not having any big issues with this issue. I understand that the FSC chambers are also working through this issue. The gov't has a Code and the marketplace can determine what indicators are needed.

Issue #2. Environmental Baseline information and #3. Sustainable resource benefits
It would be useful to know exactly how this info will help the forest industry improve and be better at managing the environment. These two projects are obviously linked to # 1 so it seems that # 1 should be justified before embarking on the other two. We have had experience with collecting TEM and FDIS info and have had concerns with following RIC standards and not necessarily getting good value for the time and dollars invested. An evaluation of the utility of these products would be of benefit.

Comment #8
Reviewer group: Research/Academia/Forest Industry
Comment: Interesting approach re the focus on sustainable forest management, but I am concerned that the push behind knowledge gaps to completing LRMP's may be loosing support in favour of these new issues. For our region, achieving the regional land use plan is a form of sustainability test that we have yet to complete throughout the different planning levels (regional, subregional and landscape level). From my perspective, this is the most important task at hand in that these plans are higher level plans and require and adequate amount of support and analysis in order to assure ourselves that they actually achieve our intended results. In our region there are many remaining 'unknowns' or 'gaps' that we would like to see the SSFM dollars assist in addressing.

As I am sure you are aware, each region in the province has a very different approach and perspective on the utility (short and long term) and on the measurement (area, volume, animals, jobs, etc) or record keeping of achievement. I can only assume that the task of developing provincial initiatives within the SSFM mandate for the next fiscal year is extremely challenging, especially in light of how different each land use planning process is. In the Cariboo, our intention is to move through the remaining sub-regional and then landscape level planning processes to assure ourselves that the CCLUP can meet its many promises. I would hesitate to commit to supporting additional initiatives, if in doing so we reduce the time and effort available to complete our CCLUP related tasks. I do not want you to interpret this as a lack of support for

your initiative, consider it an acknowledgement that our attention is focused on regional tasks at this time.

Comment #9
Reviewer group: Research/Academia/Forest Industry
Comment: If I could add one commentary it would be related to <a missed opportunity to provide input>. The missed opportunities by industry to thoughtfully prepare input in a timely way. This is a common approach by FRBC and one which has been highlighted as a problem on many occasions. I don't think anyone would have enjoyed my work schedule/demands over the past month, this is not a complaint, just the realities faced by industry members these days. In moving forward, the planning for efficient delivery and input needs to consider the demand on those working so hard to continue generating the revenues for this program, as a secondary aspect of their business requirements. I noticed that there was no forest industry representatives among the members of Management Planning Team, again this is a serious oversight.

In an "executive summary" style overview, I can give general support towards the three major driving forces outlined. The devil is always in the detail however, and I would recommend that the next stage include a focus on strategic evaluation of that detail, in order to effectively plan the implementation . This serious planning stage should involve the appropriate industry perspectives, prior to implementation. Please consider these comments in the constructive manner they were intended.

3. Other comments

Comment #10
Reviewer group: Research/Academia/Forest Industry
Comment: At this point in time it is difficult to get motivated to provide in depth comments on the information you have sent for my review. With the winds of change blowing, I found the task the I volunteered for to be difficult to deliver. With that said... I have no significant feedback to offer at this time. I feel the information as presented appears to be reasonable and while I am sure that minor changes are forth coming I have nothing further to add.

Comment #11
Reviewer Group: Ministry
Comment: I had a quick read-over...it all looks good to me...I agree with the three main issues/strategies & I think they are well documented

Appendix 1

Headquarters Resource Management Planning Team for Strengthening Sustainable Forest Management

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See key, next page.

Key to Appendix

SSFM Component Leaders

*1 Standards for Criteria and Indicators to Support Forest Management Certification
*2 Towards an Environmental Baseline for Sustainable Forest Management
*3 Supporting Sustainable Resource Benefits in Strategic Planning Processes

Agency acronym

AGF	Ministry of Agriculture, Food and Fisheries
FOR	Ministry of Forests
FRBC	Forest Renewal British Columbia
LUCO	Land Use Coordination Office
SRM	Ministry of Sustainable Resource Management
WLAP	Ministry of Air, Land and Air Protection

Headquarters Resource Management Plan for Strengthening Sustainable Forest Management

Growth and Yield Component

2002-2003

FOREST RENEWAL BC

October 5, 2001

BRITISH COLUMBIA

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Introduction

Resource management planning was introduced in 1998 as a way to link resource management objectives with investment making decision and project selection. The Headquarters Resource Management Plan (HRMP) is the equivalent of the regionally developed Resource Management Plan (RMP).

The HRMP is an inter-agency plan for identifying resource management issues under each Forest Renewal BC Strategic Objective (SO) that is provincial in nature and that support activities in the region.

Headquarters Resource Management Planning

The HRMP Process follows the "spirit and intent" of the SSFM RMP Guidelines. That is, for each Strategic Objective a set of issues, and where applicable a number of sub-issues, were identified which, when resolved based on a well-defined strategy, achieve or contribute to the achievement of the SO's performance measure.

For upcoming fiscal 2002-03, the Growth and Yield (GH) planning team (Appendix 1) for the Headquarters Resource Management Plan (HRMP) recommends GH investments to address the key provincial level Issues. This document provides context and rationale for these Issues. Readers interested in going directly to the GH Issues and Strategies are directed to the GH Templates (Appendix 2). On Forest Renewal BC (FRBC) approval of the proposed Issues and Strategies, the planning team will develop details of the required activities.

Forest Renewal BC is committed to an open and transparent planning process. As such, several reviewers from Ministry, Academia and the private sector were selected to provide input and feedback regarding the Headquarters Resource Management Plan for this component. This involved reviewing and commenting on the "Template 1" - Issues and "Template 2" - Strategies. Reviewers were asked to comment on the Issues (Template 1) and Strategies (Template 2) as to their objectives, eligibility and need. The comments and input can be found in Appendix 3.

GH and FRBC Strategic Objectives

Strengthening Sustainable Forest Management (SSFM) is one of the six FRBC Strategic Objectives that strive to improve forest management decision making, grow more high-value timber, restore the environment, and enhance the value-added sector (visit *http://www.forestrenewal.bc.ca/*). The Growth and Yield component is encompassed within the SSFM Strategic Objective. In addition to SSFM, the other Strategic Objectives:

- Sustainable Harvest
- Enhance Environmental Values
- Strengthen and Expand the Value Added Sector
- Stimulate Workforce Development to Strengthen the Forest Sector
- Sustain and Diversify Forest Community Economies

Specifically, Forest Renewal BC investments in SSFM will assist:

> *"...in the development of relevant, useable, timely information and tools that are keyed to developing sustainable forest management".*

The five-year strategic SSFM target:

> *"Forest Renewal BC will work with its partners to identify key gaps in knowledge for sustainable forest management. By April 1, 2003, these key knowledge gaps will be addressed to help improve future Timber Supply Reviews and Land and Resource Management Plans".*

HRMP GH Planning Process

The 2002-03 HRMP SSFM planning process was an inter-agency, collaborative effort of staff from

- Ministry of Forests
- Ministry of Sustainable Resource Management

The GH HRMP planning process began in June 2001 and comprised team meetings to identify the Key GH Issues. Several issues were identified and leaders were identified to document issues. One main issue was subsequently developed from the initial meeting.

The GH planning team provided input on several iterations of the Issues and Strategies templates before a wider technical peer review by agencies and SSFM stakeholders (Appendix 4). Following the technical review, the GH template information was modified to reflect peer review comments and suggestions.

Documents guiding the headquarters planning process included:

- HRMP Guidelines
- HRMP/HIP Ground Rules
- 2002/03 Resource Management Plan Guidelines
- 2001/02 Resource Management Plan

Summary

To the best of the component leader's ability, comments were rationalized and incorporated into the Template submissions. In general, the comments received fell into one of three categories as follows:

- **editorial** – required wording change
- **required specific change** – specific wording or additional ideas were incorporated
- **required no change** – comments of general nature which required no change

Not all of the editorial comments have been documented (such as editorial or those that required no change) but have been addressed where required. Based on the reviewers' comments, templates have been reviewed and revised.

Appendix 1 – Planning Team

HRMP Team for Growth and Yield

Name	Agency	Branch/ Section
Cam Bartram	MSRM	Growth & Yield
Rick Brand	MoF	Forest Sector Initiatives
Ken Mitchell	MoF	Forest Productivity and Decision Support
Louise de Montigny	MoF	Forest Productivity and Decision Support
Gord Nigh	MoF	Forest Productivity and Decision Support
Barrie Phillips	MoF	Forest Productivity and Decision Support
Keith Thomas	MoF	Forest Productivity and Decision Support
Jon Vivian	MSRM	Growth & Yield
Ralph Winter	MoF	Silviculture Practices Section

MoF Ministry of Forests
MSRM Ministry of Sustainable Resource Management

Appendix 2 – GH Templates

Knowledge Issues and Strategies Templates #1 and #2

Template 1 - HRMP GY Issue

Strategic Objective: Strengthening Sustainable Forest Management	
Issue # 1	**Title: Underestimation of Site Productivity/Site Index**
Sub-issue #	**Title:**

Overview Description of the Provincial Level Issue:

Sustainable forest management depends on, among other factors, site productivity/site index estimates for harvesting timber at a sustainable level. To accurately determine this level, our ability to estimate the site productivity of British Columbia's forests under all resource management regimes needs to improve. Research suggests that current estimates, particularly in second-growth stands, underestimate forest productivity by as much as 6-10 million m^3. Improved and refined site productivity estimates is a province-wide issue that once resolved will:

- increase future potential harvest by 6-10 million m^3 and compliment Forest Renewal BC's strategic objective of increasing the potential future harvest by 25 million m^3 over the next 5 years;
- provide the tools and data to improve growth and yield predictions by models;
- reduce the risk and uncertainty currently associated with setting harvest levels during the Timber Supply Review (TSR); and,
- lead to sustainable forest management and investment decisions by providing information and tools to support an "ecologically based" approach to forest management.

Relationship to Strategic Level Objective:

<u>The maintenance of environmental values</u>

Site productivity is currently underestimated in BC's forests. Better information on this issue has the potential to increase estimated volume by as much as 6-10 million m^3, therefore less area may be required for maintaining or increasing the allowable annual cut (AAC). This will reduce the risk and uncertainty associated with the maintenance of environmental values (biodiversity, wildlife habitat, wildlife corridors etc...) by providing forest managers greater opportunity and flexibility to preserve and enhance these values when making land-use decisions, without having a negative impact on harvest levels.

<u>Sustainable Use of Timber Resources</u>

One key component to ensuring sustainable forest management determination of the AAC is the Timber Supply Review (TSR), which among other factors, considers different resource management regimes and the associated implications on growth and yield. Site productivity is an important variable in estimating the growth and yield of these forest stands. Therefore, changes in these estimates can have significant positive or negative impacts on the timber supply analysis and associated forest management planning. Developing more reliable and precise estimates will provide better growth and yield information thereby reducing the current risk and uncertainty associated with setting and maintaining a sustainable AAC.

Sustainable use of non-timber resources

Management of non-timber resources depends, to some extent, on our knowledge of the growth and yield of stands. Improved site index estimates will lead to more reliable growth and yield information, which will provide greater precision in estimating existing forest productivity. A better understanding of the timber resource will facilitate the implementation of an ecosystem approach to forest management which will enable forest managers to make more informed planning decisions that encourage and foster sustainable use of non-timber resources.

Relationship to Strategic Resource Plans and Decisions:

Strategic decisions

Site productivity estimates are an essential component of the TSR and subsequent AAC determination by the Chief Forester. The TSR and associated AAC(s) are updated every 5 years for Tree Farm Licences and Timber Supply Areas throughout the province thereby emphasising the need for improved site productivity estimates of of BC forests. By resolving this issue, some risk and uncertainty in our growth and yield projections for forest stands will be removed which will lead to more reliable timber supply projections and analyses, and subsequently improved AAC determinations that are more indicative of forest management regimes.

Resource plans

Silviculturists use site productivity estimates when developing silviculture prescriptions. It is an important consideration when making forest management decisions such as pruning, fertilisation, and estimating age to green-up and the associated adjacency constraints. Site productivity is a key determinant in design stand structure goals for timber, value and habitat supply objectives as well as key to the efficient linking and timing of treatments that are necessary to produce the desired objectives. Inaccurate estimates of site productivity could cause funding to be misdirected to stands where certain treatments may not be optimal. Improved estimates of site productivity will lead to more optimal scheduling of stand-level treatments. Silviculture strategies and prescriptions are being developed continuously and if site productivity estimates are incorrect, the type or emphasis of the strategy could be misguided (i.e. the strategy might be a volume oriented when it really should have been value oriented once new site productivity information was determined). In addition to AAC determination, timber supply analysis, which uses site productivity estimates and associated growth and yield projections, is also used for land-use and forest management planning. Therefore, improved estimates of site index will lead to a more ecological approach to forest management planning and timber supply analysis.

Detail the timing of upcoming strategic decisions and/or planning efforts.

AAC rationales are completed every 5 years, thereby emphasising the need to provide key and timely information on better estimates of site productivity for BC's forests under all resource management regimes on an ongoing basis to ensure successful TSR's and sustainable AAC determinations. The ultimate goal is to provide more reliable estimates that are within 10-15% of actual site productivity.

Cross Reference to other Provincial or Regional Issue or sub-issue (if applicable):

This issue has been identified as a high priority in the Vancouver RMP (SSFM), Prince Rupert RMP (SSFM), Prince George RMP (SSFM), Nelson RMP (SSFM), Cariboo RMP (SSFM), and the Kamloops RMP (SSFM).

TEMPLATE 2: HRMP GY Issue Strategies

Issue # 1	Title: Underestimation of Site Productivity/Site Index
Sub-issue #	TITLE:

Overview Description of the Issue Strategy:

Site productivity/site index estimates are an essential component of the TSR and subsequent AAC determination by the Chief Forester. Research suggests that current estimates underestimates forest productivity by as much as 6-10 million m^3 across the entire province. The Forest Productivity Council (FPC) and the Site Productivity Working Group (SPWG) have identified this as a high priority area that is provincial in scope. By resolving this issue, some risk and uncertainty in our growth and yield projections for forest stands will be removed which will lead to better timber supply projections and analyses, and subsequently improved AAC determinations that better reflect forest management regimes. This strategy involves more effective use of existing and new information to improve estimates of site productivity of BC's forests. Existing information will be re-analysed and validated, and knowledge gaps identified so that new information can be collected, as appropriate, to improve precision of these estimates. Tools and models will be developed to validate the fidelity of the existing timber supply, realise the anticipated underestimation of 6-10 million m^3 and help Forest Renewal BC meet the strategic objective of increasing the sustainable harvest by 25 million m^3 over the next 5 years. The ultimate goal is to provide more reliable estimates that are within 10-15% of actual site productivity.

Status of Existing Knowledge:

Research on site productivity/site index has been underway for a number of years, and has formed the basis of all growth and yield initiatives. Presently this information is stored in a database that is continuously used during TSR and subsequent setting of AAC levels, and incorporated into models that are used throughout the industry. Existing estimates of site productivity have been , assessed and results suggest that for many stand conditions in the province these estimates are often substantially underestimated. This underestimation, when translated into existing standing volume, equates to approximately 6-10 million m^3. Due to the complexity of the issue, approximately 30-40% of the required data necessary to refine and improve estimates of forest productivity have only been collected. Site productivity research is widely disseminated through Ministry publications, field-book supplements, workshops, scientific publications, and the incorporation of the site productivity tools into user-friendly, widely distributed software (e.g. SiteTools).

Describe the Required Activities in these Areas (as applicable):

As we move toward an ecological approach to forest management improved site productivity estimates combined with PEM/TEM and SIBEC are key to the sustainable use of timber and non-timber resources while concurrently maintaining and enhancing the environmental values of BC's forests. Juvenile, and maturing second growth stands are becoming a significant component BC's timber supply areas. Improving our estimates of site productivity in these forest types has significant implications for green-up, agency constraints, and timing of silvicultural interventions, all of which have critical impact on long-term harvest levels, setting AAC's, and preserving environmental values across the entire province. Complex stands are also a significant component of BC's commercial forests and are increasingly being utilised, but little is known about how to manage these multi-specie and multi-aged stands, and accurate estimates of site productivity are required. This kind of information is needed as a basis for generating yield projections for complex stands and to provide the basis for refinement and development of models for estimating yield of mixedwood stands, as well as the financial implications of stand tending practices in these stands. The emphasis of this work is in the Northern and Southern interiors. We need to validate existing

tools and develop new tools in order to improve current estimates of site productivity in all these forest types. The tools to be developed, validated and refined are:

1. *Height-age (site index) models* are crucial for both evaluating site productivity and projecting heights. Growth intercept models are widely used to evaluate site productivity in juvenile managed stands. The models form a basis for generating yield projections for many stands in BC, and provide the basis for refinement and development of models for assessing the implications of stand tending practices in these stands. This is a high priority project area because of the widespread use of height-age and growth intercept models for assessing the productivity of forested land for sustainable forest management.
2. *SIBEC models* are crucial for evaluating site productivity of all forest stands in British Columbia for long-term timber supply forecasting. On-going data collection to fill priority data gaps and upgrading existing data will enable refinement of the site index/BEC correlation model and the site index estimates by BEC site series and tree species. This is a high priority project area because there are an increasing number of site index adjustment projects that are interested in refining SIBEC estimates to assign site index to polygons for timber supply analyses.
3. *Juvenile height models* allow accurate estimates of the number of years it takes a stand to reach breast height and green-up height, as well as allowing good estimates of juvenile height growth. The models form a basis for supplying information for timber supply modelling (green-up, adjacency constraints), for assessing the financial implications of stand tending practices (planning surveys and schedule treatments), and for assessing silviculture treatments and in growth and yield modelling. New models for other species also need to be developed and existing models need to be validated throughout British Columbia. This is a high priority project area because of the widespread use of juvenile height growth models for sustainable forest management.

Define Performance Indicators, Targets & Milestones:

Tools and models will be developed to validate the fidelity of the existing timber supply, realise the anticipated underestimation of 6-10 million m^3 and help Forest Renewal BC meet the strategic objective of increasing the sustainable harvest by 25 million m^3 over the next 5 years. Thereby reducing the risk and uncertainty currently associated with setting harvest levels which will lead to sustainable forest management and investment decisions. In order to achieve these goals this strategy will:

- Validate existing growth intercept models by 2004.
- Validation of the juvenile height growth models for lodgepole pine and interior spruce by 2003.
- Collect high-quality data for the SIBEC database (upgrading existing data and new data) for incrementally developing a Second Approximation of site index estimates by site series. Provided there is adequate funding 50% of the second approximation will be completed by 2005.
- Validate and re-calibrate models for curve shape for significant species by 2005.
- Develop and validate models for estimating growth of white spruce in birch and aspen complex stands in the SBS will be completed by 2004.

Describe Relationship to Other Strategies (if applicable):

This strategy is supported by the FPC and the SPWG strategies both of which have identified this as a high priority area that is provincial in scope. This strategy is also related to the Predictive Ecosystem Mapping (PEM) initiative which recognises the need to improve our estimates of site productivity (in conjunction with the SIBEC) in order to better manage the forest resource. Due to

the complexity and magnitude of the work, it would be best to implement this strategy over-time to ensure maximum and efficient coverage of the province.
Cross Reference Activities to other strategies as applicable: Consistent with activities identified in the Forest Productivity Council and Site Productivity Working Group strategies. Complements the PEM/TEM initiative.

TEMPLATE 1: HRMP GY Issue

Strategic Objective: *Strengthen Sustainable Forest Management*	
Issue #: 2	**Title: Improving Growth and Yield Predictions for Better Resource Management Decisions**
Sub-issue #	**Title:**

ISSUE

There is uncertainty in existing, and a lack of, specific growth and yield tools regarding our ability to accurately predict the productivity and quality of BC's forests under any resource management regime.

Forest Renewal BC's Strategic Objective 1 – Sustainable Harvest is to increase the timber available for potential harvest by 25 million cubic meters over the next 5 years. In order to realize this objective while maximizing our return on investment and avoiding inadvertent degradation of future resource values, growth and yield tools need to be developed or improved so that they accurately predict the productivity and quality of BC's forests under any resource management regime. In addition to supporting forest-level analysis of silviculture investment decisions, the information will also support:

- Better and more informed decisions for sustainable forest management
- The chief forester and the Timber Supply Review
- Developing management prescriptions that can achieve a variety of resource management objectives across the land base;
- Revealing new ways to achieve higher productivity in future stands.

Relationship to Strategic Level Objective:

The issue relates to reducing risk or uncertainty by:

i. *The maintenance of environmental values*

Existing information contributes to silviculture prescriptions that support biodiversity and improved habitat for plants, wildlife and other organisms. Without continued work, we will not be able to provide this information for new prescriptions, harvesting regimes and stand types, and there will be a risk of reducing biodiversity and impairing habitat quality.

ii. *The sustainable use of timber resources*

Without accurate growth and yield models, the probability of overcutting or undercutting is greatly increased. In particular there is a high level of risk and uncertainty in predicting the future harvest from complex stands which are expected to make an increasing contribution to the long-run sustainable yield of the forests in BC. There are also financial risks associated with investing in silviculture practices across the province when the returns may be higher for certain species on particular sites.

iii. *The sustainable use of non-timber resources*

We have information requests in support of berry production, large woody debris in stream habitat and other non-timber resources that will not be fulfilled. There is a risk that these and other resource opportunities will be lost.

Relationship to Strategic Resource Plans and Decisions:

i. *Strategic Decisions*

Accurate growth and yield predictions are essential to the Chief Forester's determinations of

AACs. However, inventory audits indicate significant volume over- and under-prediction for some management units. There is still considerable uncertainty about the yield implications of many intensive management practices and there is still very little information available on expected yields from partial cutting and from harvesting species such as aspen. Forest health is a concern in many management units as well but the impacts on yield are still not well understood. Resolution of the issue will lead to more accurate timber supply projections that are central to the determination of AACs.

ii. *Resource Plans*

Understanding of the growth and yield implications of alternative silviculture practices is critical in the development of silviculture plans. This is not only true at the cut block level but also for achieving the objectives of silviculture investment strategies for entire management units.

AAC determinations must be completed every 5 years so there is a need to supply the best possible growth and yield information to TSR on an ongoing basis.

Cross Reference to other Provincial or Regional Issue or sub-issue (if applicable):

RMPs for all Regions except Prince Rupert identified growth and yield knowledge gaps as high priorities for attention.

TEMPLATE 2: HRMP GY Issue Strategies

Issue # 2	Title: Improving Growth and Yield Predictions for Better Resource Management Decisions
Sub-issue #	TITLE:

Overview Description of the Issue Strategy:

Growth and Yield (GY) is a keystone for all timber and non-timber planning, silvicultural prescription and investment decisions. It is the foundation of sustainable resource management. This strategy for improving our growth and yield projection capabilities requires the effective use of existing data and models, and the collection of new information. Both are critical to the development and validation of tools that reliably portray the growth, yield and dynamics of any forest stand in British Columbia in support of better and more informed resource management decisions. The GY tools are also a critical link to measuring and displaying key criteria and indicators for certification, for measures of sustainability and for habitat supply projections (i.e. suitability and capability)

Status of Existing Knowledge:

Over the last several decades, the Ministry of Forests and other organizations in BC initiated GY modelling for various applications including inventory update, silviculture planning and timber supply forecasting. However, the potential impacts of errors in GY projections increase as demands on the forest resource intensify. Thus, the importance and impact of accurate GY analysis is increasing rapidly. Recent Provincial initiatives (e.g. the Timber Supply Review, Forest Practices Code, strategic level land use planning, Forest Level Silviculture Plans, the Protected Area Strategy), new forest management approaches (e.g. partial cutting and the trend toward collaborative ventures), and joint delivery programs have placed new demands on GY activities throughout the province. At the same time, tree species that have historically been of little commercial value are now growing in importance. To address these concerns, we must improve our confidence in inventory estimates and projections, and extend our understanding of the growth and yield implications of new silviculture systems and treatments. Accurate GY projections also depend, to a large extent, on accurate estimates of site productivity. This strategy complements and supports the concurrent activities identified in the Site Productivity strategy (SSFM GY Issue 1). The Forest Productivity Council, through several initiatives (listed below), has identified forest conditions for which current GY tools and/or data are inadequate. This strategy addresses the gaps in GY predictions of greatest strategic importance to the major client groups (based on a June 2001 Workshop at Mesachie Lake).

Describe the Required Activities in these Areas (as applicable):

Improvements in growth and yield predictions of greatest strategic importance are listed below. Priorities will focus on large knowledge gaps, and minor improvements that will improve accuracy appreciably. These activities are inter-related, and cannot be addressed independently.

1. Silviculture Treatments – Large-scale silvicultural investments in BC are driven by expected increases in timber supply and other resource values. For example, the Sustainable Harvest key provincial target anticipates that silvicultural treatments will increase the harvest potential by 25 million cubic meters. Without accurate growth and yield models, the probability of overcutting or undercutting is greatly increased. This underscores the need for GY tools and data that reflect our best estimates of treatment response in order to maximize return on investment and avoid inadvertent degrading of future resource values. As well, enhanced GY linkages to habitat,

biodiversity indicators and forest health are needed to strengthen prescriptive abilities in these areas. Treatment-specific data will be collected to enhance existing models and tools, in support of these objectives.

2. Complex stands –These are unevenaged, multi-storied, or mixed species stands with even or uneven vertical structure. Although complex stands occur naturally throughout BC, the greater emphasis will be on those created by partial cutting harvest systems. The latter category now occupies a large proportion of the landbase. Partial cutting is advantageous because it can be applied in areas with harvest constraints - thereby increasing the harvestable landbase. Also, more accurate predictions of mean annual increments of complex stands may increase the AAC. Limited work in complex stands has been initiated, but much more is needed to meet the increasing demand for models that can predict the development of these stands in support of both strategic and operational planning. Given the risks and uncertainties of long-term projections, empirical, mechanistic and process driven modelling approaches all contribute at different resolutions and scales. The .nain requirements for work are a) to project of the GY of existing stands into the future, and b) to assess the response to alternative silviculture treatments. This will be assisted by data collection from new and existing installations, enhancements of existing models and development of new models. Information from each of the other 4 activities will also contribute to a better understanding of complex stands.

3. Young Stands – Green-up, free-to-grow and variable retention systems are making the growth of young trees an increasingly important aspect of GY. Better tools and data will lead to solutions for reducing regeneration delays thereby allowing potential increases in AACs. Quantifying regeneration is difficult given its probabilistic nature, but is especially important for complex stands since it drives stand replacement, species succession and, ultimately, long-term yield. Regeneration establishment and the impact of competing vegetation on young tree growth are absent in most existing GY models. As trees age, the increasing importance of external growth-modifying impacts such as insects, disease and weather damage, has also been overlooked in GY modelling, largely because of the complexity. Work on this activity will include the development of protocols for modifying silviculture surveys to allow the collection of the required data at minimum cost; remeasurement of existing experiments; establishment of new experiments; and the modification of models to incorporate young stand development.

4. Inventory-based projections – Current forest inventories need to be updated to estimate future forest conditions for timber supply analyses and other purposes. Work will focus on: 1) the collection of data (through Regional RMPs); 2) the completion of VDYP 7 to take advantage of the new Vegetation Resources Inventory; 3) the inclusion of other models (managed stand and complex stand models) in the provincial inventory system; 4) the development of monitoring protocols; and 5) the development of the Inventory Projection System which will link all models, thereby providing a seamless approach for projecting the inventory.

5. Forest Health – Meaningful investment analysis of forest health mitigation practices requires the ability to predict the GY impacts of various forest health conditions and related treatment effects. New silvicultural systems and strategies, such as variable retention, may have forest health implications that we are currently unable to quantify. Traditional forest health studies need to be supplemented with stronger connections to GY models. A forest health strategy will be developed, a pilot program for data collection will be implemented and models will be developed as data becomes available.

Define Performance Indicators, Targets & Milestones:

Ultimately, the goal is to accurately predict growth and yield of any stand to within 10% of the actual stand conditions. However, to date there is no reliable way to estimate accuracy. The monitoring program to be initiated by MSRM will provide data for validation. The proposed work along with this new validation information will result in quantifiably better predictions for each of the 5 activities within 5 years.

For each activity, the strategy involves a 4-step process. Each activity may require more or less of steps 2 to 4 to achieve the final product.

1. Development of an Implementation Plan - A GY implementation plan will be developed by March 2002 to identify the largest knowledge gaps, and recommend how best to address these gaps. This plan will be a coordinated multi-agent effort that involves all clients (e.g. industry, universities and government organizations including GY Co-operatives). The plan will detail the priorities and the specifics of accomplishments for each of the next3 years.
2. Data Collection - Both the EP and PSP matrices will be updated and number of plots to be measured streamlined to eliminate the collection of redundant information. Long-term experiments or permanent sample plots that address specific needs of the activity will be remeasured (PSP data will be collected through SSFM RMPs). The Implementation Plan (step 1) will identify where establishment of new experiments and PSPs are most urgently required.
3. Model Building and Validation - Models (e.g.TASS, MGM, Prognosis and VDYP) be enhanced with yearly deliverables. Details of work to be done in each of the 5 activities will be specified in the Implementation Plan (step 1).
4. Application and Extension – Publications and training will extend the knowledge achieved. Details of publication, training and other extension will be specified in the Implementation Plan (step 1).

Describe Relationship to Other Strategies (if applicable):

This strategy is based on several strategies developed by the Forest Productivity Council of BC including:

Forest Productivity Strategy 2001-2005. April 11, 2001.
Stand Level Working Group Five-Year Strategic Plan: 2001-2001 Update. January 29, 2001.
Stand Level Working Group Needs and Recommendations for Stand Level Growth and Yield Priorities. 17 September 1999.
Stand Level Working Group and Min. of Forests. Long-Term Data Needs Workshop. Mesachie Lake, June 20-22, 2001.

And:

Growth and Yield Program Steering Committee, MoF. Growth and Yield Modelling Strategy for BC. Draft November 1997 prepared by FORUM Consulting Group.

The strategy is also related to:

Southern Interior GY Co-operative, and
Southern Interior Forest Extension Regional Partnership

Cross Reference Activities to other strategies as applicable:

All activities have been identified as high priority areas in each of the documents listed above. These activities will be important for achieving success in other strategies including criteria and indicators, sustainable forest management plans, certification, and habitat biodiversity. The activities are also linked to the Site Productivity strategy (SSFM GY Issue 1).

Appendix 3 – Reviewer Comments

Growth and Yield Reviewer Comments
Below are the comments received for the Growth and Yield component Templates 1 and 2.

Overall, the two sets of documents do a fair job of covering the full range of G&Y issues from the ministry perspective. Together they encompass the entire G&Y program. In that regard, they are much more general than their regional RMP counterparts (I've been tracking G&Y in the regional RMPs). This means their scope and milestones are perhaps too broad to be manageable; this is particularly true for "Improving G&Y Predictions". I agree, we will need a more detailed implementation strategy to guide investments in specific G&Y projects – marginal utility, etc.

As to be expected, there is considerable overlap (duplication) with regional RMP projects. This is OK at the strategic stage, but it should considered in future funding decisions. Be aware of the "split" in ministry vs. industry projects in the regional RMP lists. Both will have to be examined to get the full picture.
Both HRMP G&Y issues should cross-reference:

- Each other
- Regional RMPs
- Forest Productivity Council and all its working group strategies
- Southern Interior G&Y Co-op
- Southern Interior Forestry Extension and Research Partnership (includes the coast now)
- Northern Forestry Research and Extension Partnership

I just have a few comments regarding the documents though I feel they are general in nature. Are we looking for better information or are we looking for improved reliability around the numbers that we use. I guess I ask that because I wonder if the research on G&Y may be partly lacking because we are not consistently doing remeasurements or are losing the ability to continue the remeasurements. Do we classify remeasurements of PSP's as research or is it operational (though they serve as a dual role - had to ask as I am not up to speed on this).
Template 2 -Underestimation of Site productivity.....
Status of existing knowledge: Is the research the important part only,.... or is it the data collection and the research together that gives us the validation that can be used for TSR etc..
Define performance indicators: last bullet - Is this happening in only the SBS?? what about the BWBS -mixedwood issue in the NE - just wondering as I am not up to date on this.
Where does MGM fit in the equation? Is it part of the bullet 4 in " Temp-2 Underesti...." Section "Define performance indicators..."?
Thanks for the opportunity to comment. Should it be easier to phone and discuss any of my questions please do.

In my opinion, the HRMP is at too high of level and too lacking in technical detail for a review to have much technical validity. However, I certainly support the strategic aim of the growth and yield component of the plan and believe that it is a necessary prerequisite for improved management of all forest resources.

My only substantive comment is that I would restate Issue 3.1 as "Improved Estimation of Site Productivity/Site Index". I have no basis for assessing whether the figure of 6 to 10 million m^3 "underestimation" is valid. While I do expect that we are underestimating the productivity of second growth stands to some extent, overall, we are likely not doing so under all conditions and everywhere. It is quite possible that we are overestimating productivity under some conditions and in some locations. Another point that needs to be made more clearly is that underestimating the potential future yield of second growth stands is not simply an issue of incorrect site indices. There are other components of stand dynamics (e.g., density, mortality, stand establishment) that we may not be modelling well. These components also impact on our predictions of yield and are not necessarily related directly to site index.

Appendix 4 – Technical Peer Review

Below are three lists of reviewers for the GH component. Those who responded are also identified.

HRMP Peer Review - Growth and Yield

Name	Affiliation	Response
Ken H. Baker	MoF (Deputy Chief Forester)	
Jeff Monty	SRM (Acting Director)	
Valerie LeMay	UBC	
Peter Affleck	ILMA	
Pat Bryant	Canfor, Woss	
Steve Stearns-Smith	SIGY	Yes
Oscar Garcia	UNBC	
Mike Byl	Industry, Dawson Creek	Yes
Peter Marshall	UBC	Yes
Winn Hays-Byl	Planning Officer, SRM, D.C.	Yes
Mark A. Gillis	CFS	

CFS	Canadian Forest Service
ILMA	Interior Lumber Manufacturers Association
MoF	Ministry of Forests
SIGY	Southern Interior Growth and Yield Cooperative
SRM	Ministry of Sustainable Resource Management
UBC	University of British Columbia
UNBC	University of Northern British Columbia
WLAP	Ministry of Water, Land and Air Protection